

Claims

- [c1] 1.A test socket comprising:
- a base for attachment to a test board;
 - a guide having a bevel for accepting an edge of a memory module during insertion into the test socket, the bevel for sliding the memory module into a position for testing;
 - a first housing shell, pivotally attached to the base along a first pivot axis;
 - a first activator, coupled to the first housing shell, to move the first housing shell to pivot around the first pivot axis to open and close the test socket;
 - a first membrane, attached to the first housing shell to pivot with the first housing shell;
 - first contacts on the first membrane, that make physical and electrical contact with first metal contact pads on a first surface of the memory module when the first activator pivots the first housing shell to close the test socket, but do not make electrical or physical contact with the first metal contact pads on the memory module when the first activator pivots the first housing shell to open the test socket;
 - a second housing shell, pivotally attached to the base

along a second pivot axis;
a second activator, coupled to the second housing shell, to move the second housing shell to pivot around the second pivot axis to open and close the test socket;
a second membrane, attached to the second housing shell to pivot with the second housing shell; and
second contacts on the second membrane, that make physical and electrical contact with second metal contact pads on a second surface of the memory module opposite the first surface when the second activator pivots the second housing shell to close the test socket, but do not make electrical or physical contact with the second metal contact pads on the memory module when the second activator pivots the second housing shell to open the test socket.

[c2] 2.The test socket of claim 1 wherein the first housing shell pivots toward the second housing shell to close the test socket, but pivots away from the second housing shell to open the test socket;
wherein the second housing shell pivots toward the first housing shell to close the test socket, but pivots away from the first housing shell to open the test socket.

[c3] 3.The test socket of claim 2 wherein an opening above the guide is enlarged by the first and second housing shells pivoting away from each other to open the test

socket, but the opening above the guide is reduced by the first and second housing shells pivoting toward each other to close the test socket.

[c4] 4.The test socket of claim 3 wherein the first housing shell is pivotally attached to the base by a first hinge along the first pivot axis;
wherein the second housing shell is pivotally attached to the base by a second hinge along the second pivot axis.

[c5] 5.The test socket of claim 3 wherein the first housing shell is pivotally attached to the base by a first front-end hinge and a first back-end hinge both along the first pivot axis;
wherein the second housing shell is pivotally attached to the base by a second front-end hinge and a second back-end hinge both along the second pivot axis,
whereby four hinges attach housing shells to the base.

[c6] 6.The test socket of claim 3 wherein the first pivot axis and the second pivot axis are a same axis.

[c7] 7.The test socket of claim 3 wherein the first activator is a solenoid, an air cylinder, or a linked mechanical switch;
wherein the second activator is a solenoid, an air cylinder, or a linked mechanical switch.

[c8] 8.The test socket of claim 7 further comprising:

a spring attached between the first housing shell and the second housing shell, to exert a force between the first housing shell and the second housing shell to open or close the test socket when the first activator and the second activator are not activated.

[c9] 9.The test socket of claim 3 wherein the bevel in the guide has a funnel shape.

[c10] 10.A clamping test socket comprising:
a first housing half that pivots along a first pivot axis;
a first membrane having printed wiring traces and first contact pads formed thereon, the first membrane attached to the first housing half so that the first membrane moves when the first housing half pivots;
a second housing half that pivots along a second pivot axis;
a second membrane having printed wiring traces and second contact pads formed thereon, the second membrane attached to the second housing half so that the second membrane moves when the second housing half pivots;
an elongated opening formed between the first housing half and the second housing half and formed above and between the first pivot axis and the second pivot axis, the elongated opening for receiving a contactor edge of a memory module that has metal contact pads on a first

surface and on a second surface opposite the first surface of the memory module;

a base guide, situated below the elongated opening, for sliding along the contactor edge of the memory module when the memory module is inserted into the elongated opening;

a scooped vise clamp positioned along a first short end of the first housing half and the second housing half; and

an activator, attached to the scooped vise clamp, to move the scooped vise clamp toward the first housing half and the second housing half to close the elongated opening, the scooped vise clamp pinching together the first housing half and the second housing half;

wherein the first contact pads of the first membrane touch the metal contact pads on the first surface of the memory module when the activator closes the elongated opening by pivoting the first housing half;

wherein the second contact pads of the second membrane touch the metal contact pads on the second surface of the memory module when the activator closes the elongated opening by pivoting the second housing half, whereby the elongated opening of the clamping test socket is closed by the activator and the scooped vise clamp pinching together the first housing half which pivots about the first pivot axis and the second housing half

which pivots about the second pivot axis.

[c11] 11.The clamping test socket of claim 10 wherein the first pivot axis and the second pivot axis are co-linear;

further comprising:

a combination hinge along the first pivot axis that pivotally connects the first housing half to the base guide and pivotally connects the second housing half to the base guide.

[c12] 12.The clamping test socket of claim 10 further comprising:

a first hinge along the first pivot axis that pivotally connects the first housing half to the base guide;

a second hinge along the second pivot axis that pivotally connects the second housing half to the base guide.

[c13] 13.The clamping test socket of claim 10 wherein the activator is a solenoid, an air cylinder, or a linked mechanical switch.

[c14] 14.The clamping test socket of claim 10 further comprising:

a first elastomer disposed between the first membrane and the first housing half;

a second elastomer disposed between the second membrane and the second housing half.

[c15] 15.The clamping test socket of claim 10 further comprising:
a second scooped vise clamp positioned along a second short end opposite the first short end of the first housing half and the second housing half; and
a second activator, attached to the second scooped vise clamp, to move the second scooped vise clamp toward the first housing half and the second housing half to close the elongated opening, the second scooped vise clamp pinching together the first housing half and the second housing half,
whereby the first housing half and the second housing half are pinched together from both ends.

[c16] 16.The clamping test socket of claim 10 further comprising:
a biasing spring, attached between the first housing half and the second housing half, to force the first housing half to pivot away from the second housing half to open the elongated opening when the activator is not activated.

[c17] 17.The clamping test socket of claim 10 wherein the base guide has a funnel shape with a larger opening toward the elongated opening that narrows farther from the elongated opening.

[c18] 18. A zero-insertion-force (ZIF) hinged clam-shell socket for testing an inserted memory module comprising:

- base means for attachment to a test surface;
- guide means, having a bevel for accepting an edge of a memory module during insertion, for sliding the memory module into a position for testing;
- a first housing, pivotally attached to the base means along a first pivot axis;
- first activator means, coupled to the first housing shell, for moving the first housing to pivot around the first pivot axis to open and close a socket;
- a first membrane, attached to the first housing and pivoting with the first housing;
- first contacts means, on the first membrane, for making physical and electrical contact with first metal contact pads on a first surface of the memory module when the first activator means pivots the first housing to close the socket, but for not making electrical or physical contact with the first metal contact pads on the memory module when the first activator means pivots the first housing to open the socket;
- a second housing, pivotally attached to the base means along a second pivot axis; and
- a second membrane, attached to the second housing and pivoting with the second housing;

wherein the first housing is pivoted toward the second housing to close the socket, but is pivoted away from the second housing to open the socket.

[c19] 19. The ZIF hinged clam-shell socket of claim 18 further comprising:

hinge means, coupled to the base means, for pivotally attaching the first housing to the base means, and for pivotally attaching the second housing to the base means;

second activator means, coupled to the second housing, for moving the second housing to pivot around the second pivot axis to open and close the socket;

second contacts means, on the second membrane, for making physical and electrical contact with second metal contact pads on a second surface of the memory module opposite the first surface when the second activator means pivots the second housing to close the socket, but for not making electrical or physical contact with the second metal contact pads on the memory module when the second activator means pivots the second housing to open the socket.

[c20] 20. The ZIF hinged clam-shell socket of claim 19 wherein the hinge means comprises a first hinge along the first pivot axis and a second hinge along the second pivot axis, or the hinge means comprises a combined hinge

along the first pivot axis and along the second pivot axis.